

## **REMARKS**

Claims 1, 3, 4, 7, 9-15 and 20 are pending in the above-identified application. Of these, Claims 9, 10, and 12 have been canceled, Claims 1 and 4 have been amended, and Claim 22 has been added, leaving Claims 1, 3, 4, 7, 11, 13-15, 20, and 22 for consideration upon entry of this amendment.

### Amendments to the Title

The title of the Specification has been amended as above to reflect the cancellation of the method claims.

### Amendments to Claims

Claim 1 has been amended to include the limitations of Claims 9, 10, and 12, canceled herewith. Further support for these amendments can be found in the Specification as filed in Examples 1-27 and in Tables 1-5.

Claim 4 has been amended to remove the term “such as” and to replace it with “including”, and also to remove the term “etc.”

### New Claims

Claim 22 has been added to further claim the invention. Support for Claim 22 can be found in the Specification at least in the Examples 1-27, e.g., in Table 1, etc.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

### Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claim 4 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner has rejected Claim 4 for including the terms “such as” which is considered to be indefinite. Claim 4 has accordingly been amended to remove this term, and should now be acceptable to the Examiner. Reconsideration and withdrawal of the rejection is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1, 3, 4, 7, 9-15 and 20 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over International Patent Application Publication WO 2004/58839 (“Ahn”) in view of U.S. Patent No. 5,804,655 (“Miyatake”). Applicants respectfully traverse this rejection.

Ahn discloses an impact modifier having (a) 0.5 to 40 parts by weight (pbw, based on total composition) of a seed including (i) 65 to 99.4 pbw of vinyl monomers, (ii) 0.35 to 30 pbw of hydrophilic monomer, and (iii) 0.1 to 5 pbw crosslinker; (b) 50 to 89.5 pbw (based on total composition) of rubbery core surrounding the seed, and comprising (i) 95.0 to 99.9 pbw C<sub>2-8</sub> alkyl acrylate or diene and (ii) 0.1 to 5 pbw crosslinker, based on core monomers; and (c) 10.0 to 49.5 pbw (based on total composition) of shell surrounding the rubbery core and comprising (i) 95.0 to 99.9 pbw C<sub>1-4</sub> alkyl methacrylate and (ii) 0.1 to 5 pbw crosslinker, based on shell monomers. Ahn, p. 3, lines 1-18. In the seed, the vinyl monomer may be styrene, the hydrophilic monomer may be acrylonitrile, and the crosslinker, divinylbenzene. Ahn, p. 8, lines 7-22. In the core, the C<sub>2-8</sub> acrylate may be butyl acrylate, and the crosslinker may be 3-butanediol diacrylate. Ahn, p. 9, line 1 to p. 11, line 1. The shell may include methyl methacrylate and small amounts of other monomers to enhance compatibility with a polycarbonate matrix. Ahn, p. 12, lines 12-18.

Miyatake discloses a silicone-modified acrylic rubber particle prepared by graft polymerizing 45-5,000 pbw of siloxane rubber (B) onto 100 pbw acrylic rubber particles (A), and further grafting onto the combination of (A) and (B) 0.1 to 5,000 pbw of an acrylic shell (C). Miyatake, Abstract; Col. 3 line 26 to Col. 4, line 18. The acrylic rubber particles (A) comprise 65-99.9% C<sub>1-12</sub> alkyl acrylate (A1) including butyl acrylate, and 0-5% crosslinker. Col. 5, lines 11-33, Col. 5, line 61 to Col. 6, line 12. The siloxane rubber (B) comprises 80-99.9% of hexamethylcyclotrisiloxane, 0.1-10 % crosslinker including tetramethoxysilane, and 0-10 % graft-linking agent including beta-methacryloxyethyl dimethoxymethylsilane. Col. 6, lines 35-67; Col. 9, line 25 to Col. 10, line 6.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, or knowledge generally available in the art at the time of the invention, must provide some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

Applicants assert that Ahn in view of Miyatake does not disclose all elements of the instant claims in view of the foregoing amendments. The limitations of Claim 1, as amended, differ in core composition from the proposed composition of provided by the combination of Ahn and Miyatake. In particular, Claim 1 claims, *inter alia*, inclusion of 57.05 to 79.40 pbw of alkyl acrylate and 0.98 to 24.50 pbw of siloxane (derived from a cyclic dimethylsiloxane). However, Ahn discloses a core comprising 95 to 99.9 pbw C<sub>2-8</sub> alkyl acrylate in the core, which is greater than that claimed in instant Claim 1; and further, the alkyl acrylate portion (B)(i) of the core of instant Claim 1, which is based on 0.1 to 10 wt % of the seed, is when combined with the seed and the siloxane rubber portion (B)(ii) of the core, present in a different amount basis than that disclosed for the core of Miyatake, which though disclosing 45 to 5,000 pbw of siloxane (B) and 100 pbw of acrylate core (A), does not disclose the contribution of seed. Importing the limitations to the core of Miyatake into the core of Ahn does not overcome these deficiencies as described above.

Furthermore, “[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). To find obviousness, the Examiner must “identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

It is alleged that it would be obvious to one or ordinary skill in the art to modify the impact modifier disclosed by Ahn by grafting a silicone rubber layer onto the acrylic rubber core, as taught by Miyatake, to develop an impact modifier claimed in Claim 1. Applicants disagree.

Even if a *prima facie* case of obviousness were conceded, which it is not, it is respectfully submitted that applicant’s invention is not obvious because the particular combination of claimed elements results in unexpectedly beneficial properties. An applicant can rebut a *prima facie* case of obviousness by presenting comparative test data showing that the claimed invention possesses unexpectedly improved properties or properties that the prior art does not have. *In re Dillon*, 919 F.2d 688, 692-93, 16 U.S.P.Q.2d 1987, 1901 (Fed. Cir. 1990). Applicants note that the Examiner has incorporated prior grounds of rejection by reference, and in particular with respect to the outstanding rejection of the instant claims over Ahn in view of Miyatake, the Examiner has cited Miyatake in the Office Action dated October 16, 2008 on p. 5, section 9, last sentence, which states that “modification of the acrylic rubber with a grafted silicone rubber results in an impact modifier which provides good weather resistance and improved impact resistance to a

thermoplastic resin, citing Miyatake (Col. 2, lines 63-67). Applicants assert that Miyatake does not suggest the unexpectedly improved weather and impact resistance, particularly that seen at lower temperatures (0°C) obtained by Applicants in the instant Examples, and that therefore there is no suggestion or incentive to modify Ahn with the limitations of Miyatake to provide the unexpected results obtained by Applicants.

In particular, for comparison purposes, Applicants note Miyatake's disclosure of Example 1, which is an impact modifier including a silicone-modified acrylic rubber of 50 pbw butyl acrylate (BA)/0.25 pbw allylmethacrylate (ALMA) and 50 pbw octamethylcyclotetrasiloxane (OMCTS)/ 1 pbw tetraethoxysilane (TEOS)/0.5 pbw methacryloyloxypropyltrimethoxy silane (TSMA), where the silicone-modified acrylic rubber is grafted 70/30 with methyl methacrylate (MMA) as a shell. Miyatake, Col. 19, line 24 to C. It will be appreciated that the total siloxane content of Miyatake's Example 1 is, based on charge, about (51.5 pbw total silicone/102.25 pbw core) \* 0.7 \* 100 = 35.26 % silicone maximum; noting as well that the silicone conversion was about 86.3% (Miyatake, Col. 19, lines 51-52), the total silicone content is about 30% based on weight of the impact modifier. The impact modifier was included in an amount of 10 pbw to 100 pbw of poly(vinyl chloride). Notched Izod impact (NII, in units of kg-cm/cm) at 0°C was 30 after molding, and 18 after 300 hours aging. See Miyatake, Table 7.

A close comparison to Example 1 of Miyatake is found in Applicants Example 4, in which 25% by weight total silicone (24.5 pbw OMCTS, 0.38 pbw TEOS, 0.125 pbw TSMA, also referred to as MADS) is used in the impact modifier (2.5 pbw seed + 57 pbw BA and 0.43 pbw ALMA) and shell (15 pbw MMA). The impact modifier was included in an amount of 6 pbw based on 100 pbw of poly(vinyl chloride). NII (kg-cm/cm) at 0°C was 78 after molding, and 58 after 300 hours aging.

In addition, Ahn discloses a seed/core/shell impact modifier (Ahn, Example 1, p. 14, lines 19 to p. 17, line 7; see also Table 1, p. 22) having a nearly identical composition to that found in Applicant's Comparative Example 1 (see Table 1, p. 32 of the instant Specification). Under Applicant's testing conditions, NII of a sample of 6 pbw impact modifier of Comparative Example 1 (comparable to that of Ahn's Example 1) in 100 pbw poly(vinyl chloride) shows an NII (kg-cm/cm) at 0°C of 29 after molding, and 20 after 300 hours aging.

It can clearly be seen in a comparison of these compositions, that even with a lower amount of added impact modifier in Applicant's Example 4, as well as a lower siloxane content,

the structure of the impact modifier of the instant invention (seed (A)/ acryl core (B)(i) + siloxane core (B)(ii)/ shell (C) has significantly better impact properties that could not be expected from a simple combination of an impact modifier of Comparative Example 1 (i.e., an impact modifier of Example 1 of Ahn) with an impact modifier of Example 1 of Miyatake, notwithstanding the teaching of improved impact properties in Miyatake. Keeping in mind that instant CEx. 1 (Ahn, Ex. 1) has an NII at 0°C of 29 kg-cm/cm, and Ex. 1 of Miyatake has an NII at 0°C of 30 kg-cm/cm, if *arguendo*, in the best possible (though unlikely) case for a combination of Ahn and Miyatake, both of these values were somehow additive, the total NII would be 59 kg-cm/cm, which is significantly less than the 78 kg-cm/cm measured under these conditions for instant Example 4. Similarly and also *arguendo*, keeping in mind that instant CEx. 1 (Ahn, Ex. 1) has an NII at 0°C of 20 kg-cm/cm after aging, and Ex. 1 of Miyatake has an NII at 0°C of 18 kg-cm/cm after aging, the best possible (though unlikely) additive case for a combination of Ahn and Miyatake would result in a total NII of 38 kg-cm/cm, which is significantly less than the 58 kg-cm/cm after aging, and measured under these conditions for instant Example 4.

While Miyatake, as argued by the Examiner, teaches improved impact properties and weathering, putting this within the context of Miyatake itself, and adding to it any expected advantage of Ahn (which teaches an impact modifier of comparable properties) fails to point to improvements of the magnitude obtained by Applicants. Noting the Examiner's statement that "moderate improvements in impact resistance are desired" as motivation to combine the teachings of Ahn and Miyatake to provide the limitations of the instant claims (Final Office Action dated April 28, 2009, p. 5, section 13, last line), Applicants assert that even with a generous and highly improbable additive approach in estimating a benefit to the combination, the improvement seen in the impact resistance in Applicant's Examples is unexpectedly large in comparison, and is in no way a moderate improvement as appears to be alleged. Applicants further do not concede that such an additive approach would be expected at all. A more realistic comparison, less favorable to the Examiner's arguments, would actually be between Ahn's Example 1 (instant CEx. 1) and instant Example 4 (29 compared to 78 kg-cm/cm before aging, and 20 compared to 58 kg-cm/cm after aging), where the difference for each set of values is more than two-fold in favor of the instant examples of the invention claimed in Claim 1; and between Miyatake's Example 1 and instant Example 4 (30 compared to 78 kg-cm/cm before aging, and 18 compared to 58 kg-cm/cm after aging), where the difference is also more than two-fold in favor of the instant examples of the invention claimed in Claim 1. It will thus be

appreciated that a “moderate” improvement of, for example, 10-20%, has been far and away exceeded by the >100% improvement in NII seen in the data of Applicants’ instant examples.

Thus, a comparison of the closest cited art with the invention as disclosed and claimed in the instant claims fails to provide a suggestion of the unexpected and apparently synergistic improvement in NII at 0°C (before and after aging) for the invention claimed in Claim 1. In no way does the combination of Ahn and Miyatake teach or suggest such an improvement in NII, with and without aging.

Applicants remind that in applying Section 103, the U.S. Court of Appeals for the Federal Circuit has consistently held that one must consider both the invention and the prior art “as a whole”, not from improper hindsight gained from consideration of the claimed invention. See, *Interconnect Planning Corp. v. Feil*, 227 U.S.P.Q. 543, 551 (Fed. Cir. 1985) and cases cited therein. According to the *Interconnect* court

[n]ot only must the claimed invention as a whole be evaluated, but so also must the references as a whole, so that their teachings are applied in the context of their significance to a technician at the time - a technician without our knowledge of the solution.

*Id.* Also critical to this Section 103 analysis is that understanding of “particular results” achieved by the invention. *Id.*

When, as here, the Section 103 rejection was based on selective combination of the prior art references to allegedly render a subsequent invention obvious, “there must be some reason for the combination other than the hind sight gleaned from the invention itself.” *Id.* Stated in another way, “[i]t is impermissible to use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious.” *In re Fritch* 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992). To modify Ahn with Miyatake suggests ignoring the synergistic aspects of the composition claimed by Applicants to achieve the dramatically superior NII results found herein, in favor of simply assembling the elements of the instant claims on a template of Ahn and Miyatake.

For these reasons at least, there is no suggestion or incentive that would lead one skilled in the art to modify Ahn with the limitations of Miyatake, as the combination fails to suggest the unexpected and large (>100%) improvement in low temperature NII before and after aging as seen in the examples, for compositions as claimed in Claim 1. Therefore, Claim 1 and its dependent claims are not unpatentable over Ahn in view of Miyatake.

Conclusion

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

CANTOR COLBURN, LLP

By: /Dana A. Gronbeck/  
Dana A. Gronbeck  
Registration No. 55,226  
CANTOR COLBURN LLP  
20 Church Street, 22<sup>nd</sup> Floor  
Hartford, CT 06103  
Telephone (860) 286-2929  
Facsimile (860) 286-0115  
Customer No.: 23413

Date: February 12, 2010